Claims:

1. A structure formed with a template defining a pattern having nanoscale features that may be positioned on a substrate, the template including a resist layer having openings formed therein, where the template is configured to accommodate the controlled assembly of nanoscale objects.

2. A structure according to Claim 1, wherein the template is configured to aid in the positioning of nanoscale objects about the template and proximal to the substrate.

3. A structure according to Claim 1, wherein the template is configured to be removed from the substrate without removing the nanoscale objects.

4. A structure according to Claim 1, wherein the template is configured to accommodate the growth of nanoscale objects through the openings.

5. A structure according to Claim 4, wherein the template is configured to accommodate the growth of a nanoscale wire outward from the surface of the substrate through the openings.

6. A structure according to Claim 4, wherein the template is configured to accommodate the growth of a nanoscale object in a predetermined orientation with respect to the surface of the substrate through the openings of the template.

7. A structure according to Claim 4, wherein the template serves as a guide to accommodate the growth of a nanoscale object in a predetermined orientation with respect to the surface of the substrate.

8. A structure according to Claim 1, wherein the template is configured with openings to receive a deposition of nanoscale objects.

9. A structure according to Claim 1, wherein the nanoscale objects are a film configured to coalesce when heated.

10. A structure according to Claim 1, wherein the nanoscale objects are deposited on the template by a method chosen from at least one of the group consisting of, Langmuir-Blodgett, self-assembly, evaporation, electrodeposition, electroless deposition, dipping, spraying, physical bonding, and chemical bonding.

11. A structure according to Claim 1, wherein the nanoscale objects are chosen from at least one of the group consisting of molecular film, electroplated film, nanowires, nanoparticles, nanorods, nanotubes, fullerenes, viral particles, polynucleic acid, polypeptides, proteins, DNA, quantities of polynucleic acids, and liquids.

12. A structure according to Claim 1, wherein at least one of the openings are of a shape chosen from a group including cubic, elongated, equiaxed, triangular, and cylindrical.

13. A structure according to Claim 1, wherein the size and shape of the openings are predetermined.

14. A structure according to Claim 13, wherein the size and shape of at least one of the openings are chosen to accommodate a particular size and shape of a nanoscale object.

15. A structure according to Claim 13, wherein the size and shape of at least one of the openings are chosen so as to exclude nanoscale objects of a particular size range.

16. A structure according to Claim 13, wherein the size and shape of at least one of the openings are chosen to accommodate a plurality of nanoscale objects of a particular size in one opening, and to accommodate nanoscale objects of another size in another opening.

17. A structure according to Claim 13, wherein the size and shape of at least one of the openings are chosen to accommodate a specific maximum number of nanoscale objects.

18. A structure according to Claim 13, wherein the size, shape, and position of at least one of the openings are chosen to accommodate a plurality of nanoscale objects substantially arranged in a predetermined orientation.

19. A structure according to Claim 13, wherein the size and shape of at least one of the openings are chosen to accommodate nanoscale objects in a predetermined range of orientation coordinates.

20. A structure according to Claim 13, wherein the size, shape, and position of at least one of the openings are chosen to accommodate nanoscale objects in a predetermined arrangement, such as for example a square arrangement, other than a naturally occurring arrangement, such as a triangular close-packed arrangement.

21. A structure according to Claim 13, wherein the size and shape of at least one of the openings are chosen to accommodate nanoscale objects of different sizes within separate levels within an opening..

22. A structure according to Claim 13, further comprising a multiple level nanoscale opening having a smaller opening within a larger opening and configured to accommodate different sized nanoscale objects within the different sized openings.

23. A structure according to Claim 1, wherein the structure is positioned on a substrate having components located thereon, the template including a resist layer having openings formed therein and configured to position nanoscale objects to contact and conductively expose the components on a surface of the template opposite the substrate.

24. A structure according to Claim 1, wherein the structure is positioned on a substrate having components located thereon, the template including a resist layer having openings formed therein and configured to position nanoscale objects to contact and conductively expose the components to other components located on a surface of the template opposite the substrate.

25. A structure according to Claim 1, wherein the structure is positioned on a substrate having conductive wires located thereon, the template including a resist layer having through-vias formed therein to aid in the positioning of nanoscale objects in a manner to contact and conductively expose conductive wires located on a surface of the template opposite the substrate.

26. A method of fabricating ordered patterns of nanoscale objects on a substrate surface comprising:

applying a layer to a substrate surface;

stamping an imprint mold onto the layer; and

releasing the imprint mold to expose a template having a template surface formed into the imprint resist layer and having nanoscale openings formed therein to receive nanoscale objects.

27. A method according to Claim 26, further comprising selectively removing residual layer material from the substrate surface to expose a template having a template surface formed into the imprint resist layer and having nanoscale openings formed therein to receive nanoscale objects.

28. A method according to Claim 26, further comprising:

applying a first set of nanoscale objects to the template surface in a manner to cause one or more of the nanoscale objects to be proximal to the substrate surface through the nanoscale openings.

29. A method according to Claim 28, wherein at least one of the first set of nanoscale objects remains outside of the openings and wherein at least one of the objects contacts the substrate surface.

30. A method according to Claim 29, further comprising:

removing the nanoscale objects that remain outside of the openings.

31. A method according to Claim 30, further comprising:

removing the nanoscale objects that remain outside of the openings with a chemical wash.

32. A method according to Claim 26, wherein the nanoscale openings are ordered in a pattern with respect to at least one of the group consisting of size, shape, orientation, pattern, and position.

33. A method according to Claim 26, further comprising selectively removing a residual portion of the resist layer from the substrate surface.

34. A method according to Claim 28, further comprising removing the template from the substrate surface.

35. A method according to Claim 28, further comprising initiating a linear or non-linear growth of the one or more nanoscale objects.

36. A method according to Claim 28, wherein the first set of nanoscale objects is comprised of DNA, polynucleic acid, polypeptides, or a layer of chemistry.

37. A method according to Claim 36, wherein the DNA, polynucleic acid, polypeptides, or a layer of chemistry are further used in chemical sensing applications or as scaffolding material to construct biomolecular architectures.

38. A method according to Claim 28, wherein the first set of nanoscale objects are each configured to accommodate molecular attachment

39. A method according to Claim 28, further comprising depositing a second set of nanoscale objects to a surface of the template.

40. A method according to Claim 39, wherein the first set of nanoscale objects is of a different size than the second set of nanoscale objects.

41. A method according to Claim 26, wherein the stamping is performed by a step and flash lithographic method.

42. A method according to Claim 28, wherein the nanoscale openings are configured in a predetermined pattern.

43. A method according to Claim 42, wherein the pattern is symmetrical.

44. A method according to Claim 42, wherein the pattern is nonsymmetrical.

45. A method according to Claim 42, wherein the pattern contains at least one symmetrical pattern.

46. A method according to Claim 42, wherein the pattern contains at least one nonsymmetrical pattern.

47. A method according to Claim 42, wherein the pattern contains at least one periodic pattern.

48. A method according to Claim 42, wherein the pattern contains at least one nonperiodic pattern.

49. A method according to Claim 26, wherein the openings are of one or more predetermined sizes.

50. A method according to Claim 26, wherein the openings are of one or more predetermined shapes.

51. A method according to Claim 26, wherein the openings are positioned in one or more predetermined orientations.

52. A system for making a structure having an ordered pattern of nanoscale features on a substrate surface, comprising:

a template with the ordered pattern of nanoscale features on a substrate surface; and

means for applying nanoscale objects about the template in a manner to cause the nanoscale objects to contact or be proximal to the substrate surface.

53. A system according to Claim 52, further comprising:

means for creating the template includes means for creating a template utilizing a mold.

54. A system according to Claim 53, wherein the means for creating a template utilizing a mold includes means for creating a mold by carving a wafer in an inverse of the ordered pattern.

55. A system according to Claim 53, wherein the means for creating a template utilizing a mold includes means for creating a mold by carving a wafer in a shape complementary to the ordered pattern.

56. A system according to Claim 54, wherein the wafer is composed of one of the group consisting of metal, silicon, plastic, glass, and quartz.

57. A system according to Claim 55, wherein the means for creating a template utilizing a mold includes means for creating a mold from a wafer utilizing an electron beam.

58. A system according to Claim 55, wherein the means for creating a template includes means for creating a template using thermal imprint lithography.

59. A system according to Claim 52, wherein the nanoscale features provide vias through the template.

60. A system according to Claim 52, further comprising conductive means located on the substrate, and through-vias within the template configured to accommodate nanoscale particles that can conductively expose the conductive means on an opposite side of the template.

61. A system according to Claim 52, wherein further comprising conductive means located on the substrate, and through-vias within the template configured to accommodate nanoscale particles that can conductively expose the conductive means to other conductive means located on an opposite side of the template.

62. A system according to Claim 59, wherein the vias connect wires located on opposite sides of the template when nanoscale particles are deposited within the vias.

63. A system according to Claim 52, further comprising means for applying a second set of nanoscale objects about the template in a manner to cause the second set of nanoscale objects to contact or be proximal to the first set of nanoscale objects.

64. A system according to Claim 59 wherein the vias connect electrical devices.

65. A system according to Claim 52, wherein the nanoscale objects provide electrical function including those chosen from the group including simple electrical connection, rectification, Coulomb blockade, switching, amplification, memory, and impedance.

66. A system according to Claim 65, wherein the electrical function is provided by the nanoscale objects in conjunction with any elements to which they are connected or proximal.

67. A method of using a template to fabricate ordered patterns having nanoscale features on a substrate, said method comprising the steps of:

applying an imprint resist layer to the substrate;

stamping an imprint mold onto the imprint resist layer;

releasing the imprint mold;

selectively removing residual resist material from the substrate to expose a template having a template surface formed into the imprint resist layer and having openings formed therein; and

applying nanoscale objects to the template in a manner to cause the nanoscale objects to be proximal to the substrate through the openings.

68. A method according to Claim 67, wherein the nanoscale objects contact the substrate and operate as ball bearings with respect to aligning a second template relative to the template.

69. A method of using a mold to fabricate a template of an ordered pattern having nanoscale features, said method comprising the steps of:

applying an imprint resist layer onto a substrate;

using the mold to stamp the ordered pattern into the resist layer;

removing the mold; and

removing residual resist material from the substrate to expose the template of the ordered pattern, where the template is configured for assembly of nano scale objects.

70. A method of positioning at least one nanoscale object, comprising:

proving a template having at least one nanoscale opening, the opening being created by use of an imprint lithography process; and

applying nanoscale objects to the template in a manner so that at least one of the nanoscale objects at least partially enters the opening.

71. The method of claim 70, further comprising:

after the applying step is performed, removing the template.

72. The method of claim 70, further comprising:

prior to providing the template, creating the opening in the template using the imprint lithography process.